

## The Stunt Nematode *Sauertylenchus maximus* (Allen) Siddiqi (Tylenchida) in Pastures of Bingöl Province, Turkey

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**ABSTRACT:** The province of Bingöl, a mountainous area located in the East Anatolian Region of Turkey, has limited agricultural land but large intermountain pastures supporting the main economic resource of the region, livestock production. The stunt nematode, *Sauertylenchus maximus* was recovered from a soil sample taken during a survey to investigate plant-parasitic and other soil nematodes of pastures in Bingöl Province. In this report, morphometric measurements of the *S. maximus* are provided for females. Presently, we lack further information about its distribution and host association, which should be the subjects of further research. This species has been reported from northwestern Turkey; however, the published literature contains no record of it in the eastern Anatolian region nematode fauna. Therefore, this is a regional first report of the species.

**Keywords:** Bingöl, pasture, nematode, *Sauertylenchus maximus*



## Bingöl İli Meralarında Bodurluk Nematodu *Sauertylenchus maximus* (Allen) Siddiqi (Tylenchida)

**ÖZET:** Doğu Anadolu Bölgesinde dağlık bir alanda yer alan Bingöl ili, sınırlı tarım alanına sahiptir. Fakat dağlar arasındaki çok geniş meralar, bölge ekonomisinin ana kaynağı olan hayvancılığı desteklemektedir. Bodurlaştırılan nematod *S. maximus*, bingöl ili meralarında bitki paraziti nematodların araştırmak için yapılan bir survey sırasında bir toprak örneğinden izole edilmiştir. Bu çalışmada, *S. maximus* türünün dişilerine ait morfolojik ölçümler verilmiştir. Halihazırda, nematodun yayılış ve konukçu ilişkilerine ait veriler bulunmamakta olup, sonraki çalışmalarla bunlar aydınlatılmalıdır. Bu türün varlığı daha önce Kuzey Batı Anadolu Bölgesinden bildirilmiş fakat literatürde Doğu Anadolu Bölgesi nematod faunası açısından varlığına dair bir kayıt bulunmamaktadır. Böylece bu çalışma ile bölgede varlığı ilk defa ortaya konulmuştur.

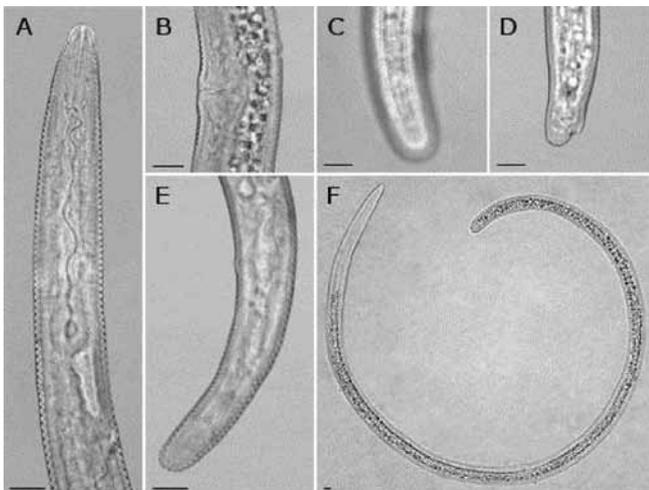
**Anahtar kelimeler:** Bingöl, mera, nematod, *Sauertylenchus maximus*

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Bingöl is located in the East Anatolian region to the east of the Upper Euphrates River, a mountainous area, which has small amount of land devoted to agriculture, whereas large areas of pastures between the mountains are used for raising livestock, the main economic activity in the region. The Province Agricultural Department has described the land possession of Bingöl as follows: Total land surface area is 8253 km<sup>2</sup>, of which 27.49% of this land is covered by forest, 10.09% of the land is devoted for forestation, 7.17% land is used for agriculture, 50.21% of the land is covered by pastures, 2.19% grasslands, and 2.85% is others. Therefore, pastures and grasslands both cover 52.40% of the total land surface area (BPDMA, 2010).

In late spring of 2011, during a survey of plant-parasitic and other soil nematodes, *S. maximus* was recovered from a pasture field in silty clay soil covered by legumes and cereals equally at 38° 46' 17.7" N, 40° 36' 10.2" E, at 1009 m above sea level. The morphology of the adult females isolated from soil samples established the identity of this as the stunt nematode *Sauertylemchus maximus* (Allen, 1955) Siddiqi, 2000 [= *Tylenchorhynchus maximus* Allen, 1955 and *Bitylenchus maximus* (Allen, 1955) Siddiqi, 1986]. Use of the *Sauertylemchus* (Allen) Siddiqi, genus nomenclature is supported in the phylogenetic analysis of Carta et al., 2010. The population density was 67 nematodes per 100 g soil. However, no study was done on the amount of damage caused by this nematode or the symptoms of the nematode-infected plants. Morphological characters used for identification included female body, stylet and tail length, shape of head, stylet knobs, and tail; number of tail annules and lateral lines in the lateral field, and vulva percentage in relation to body length (Figure 1).



**Figure 1** *Sauertylemchus maximus* from Bingöl. A, anterior end; B, vulval area; C, phasmid on tail; D, clefted tail; E, posterior end; F, entire female (Note: Scale bar for images A-F is 10 µm).

Photomicrographs of fixed specimens were taken with an automatic 35-mm camera attached to a Leica Wild MPS48 Leitz DMRB compound microscope, and measurements were made with an ocular micrometer on the same microscope. Some photographs were taken on a Q-imaging Micropublisher 5 digital camera.

This species was first described by Allen (1955) with the following features: n= 12 ♀♀, L=0.98-1.40 mm, a=37-47, b=5.4-8.1, c=16-20 V=25-2147-54<sup>21-26</sup>, Stylet= 21.3-24.0 µm long. In our study, specimens of females (n= 10) from Bingöl contained the following features: body length range= 932-1,210 µm, (mean= 1,094 µm; SD 95.1); a= 41.6-53.7 (47.9; SD 4.2); b= 6.2-8.0 (7.0; SD 0.5); c= 17.2-23 (19.2; SD 1.7); stylet length 20.5-23 (21.5; SD 0.95); esophagus length 150-170 (156; SD 6.9); V= 48-65 (52.5; SD 2.0); max body width= 20-26 (22.8, SD 2.0); anal body with 15.5-20 (18.2; SD 1.6); tail length 48-65 (56.8; SD 5.4); tail/anal body with ratio 2.7-3.4 (3.1; 0.26); lateral field 4, head annules 5-7. These morphological parameters are in agreement with Allen's description (Allen, 1955) although there are some slight differences.

Allen (1955) indicated that *T. maximus* is a common species in the Netherlands. Subsequently, *T. maximus* was reported from pasture and grasslands in Iowa by Schmitt and Norton (1978), from pastures and cereals in New Zealand by Yeates (1992) and Whatson (2004), in Romania by Ciobanu et al. (2004), and in Sweden by Sohlenius et al. (2011). The species has also been associated with several different habitats in various countries by Anderson (1977) in Canada, Turaev and Skarbilovich (1981) from apple in the Surkhandar'insk region of Uzbekistan, Dowe et al. (1990) from winter barley in Germany, Khan et al. (1992) from coconut nurseries in Pakistan, Saadabi (1993) from ornamental plants in Libya; Nombela et al. (1998) from cereals and vetch in Central Spain, Trifonova, 1998 from potato in Bulgaria, and Ryss et al. (2005) from the Nunatak Basen in East Antarctica.

In Turkey, *Tylenchorhynchus* (= *Sauertylemchus*) *maximus* was first reported by Saltukoglu (1974), from the Istanbul region in northwest Turkey; the second report was by Kepenekci (2003) from the anise plant in the inner-Mediterranean area. However, there has been no record of its presence in Bingöl and eastern Turkey; consequently, this is a regional first report of this species. Because the stunt nematodes are usually reported from grassland, pastures and cereal growing areas as the cause of yield loss, further research is needed about its distribution in pastures and agricultural areas, besides, its host association in this area.

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